Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_ Per.: \_\_\_\_\_\_\_\_

**Unit 6: Area and Volume Take Home Quiz**

Directions: This take home quiz is designed for you to complete on your own with the assistance of your notes. You may not work with another student on this quiz.

1. Write about a real world example that illustrates **Cavalieri’s Principle*.*** In your response, provide an explanation of Cavalieri’s Principle and how it applies to your example. Feel free to sketch a diagram if you think it helps demonstrate your example.

*Scoring: 3 pts.: 1 pt. for validity of example, 1 pt. for accurate explanation of principle, 1 pt. for explaining why your example demonstrates principle*

2. We have solved several problems that involved filling a 3-D solid with other 3-D solids. In one example, we found how many cylindrical candies could fit into a spherical container. Create a word problem that meets the following requirements:

1. involves two different 3-D solids (pyramid, cone, sphere, etc.) in a real world context
2. requires the solver to determine how many of one solid would fit into the other
3. includes a component that increases the difficulty (Examples: 1. The solver has to factor in that a certain percentage of the container being filled is air. 2. Given a choice of containers, the solver has to choose which would be the most appropriate to fill the other container. 3. Given the volume of a container, the solver needs to find the unknown height or radius.)
4. You must solve the problem, showing your steps clearly!
5. **See our “7.1 Introduction to Area and Volume” packet for inspiration! This will be on the wiki.**

*Scoring: 7 pts.: 2 pts. for requirements a and b, 2 pts. for requirement c, 3 pts. for accurate solution and process*

3. Write about a real world use for cross-sections. Identify the approximate shape of the cross-section OR the combination of shapes that make up the cross-section in your real world example. Since a cross-section results from a plane cutting through a 3-D solid, describe the 3-D solid (does it most resemble a cone? sphere? etc.). It may be a combination of 3-D solids. In your example, would the shape of the cross-section change if the position of the plane changed? Explain.

*Scoring: 4 pts.: 1 pt. describing a real world example, 1 pt. identifying shape of cross-section, 1 pt. identifying 3-D solid, 1 pt. explaining whether or not the cross-section would change if the position of the plane did*

4. Choose side lengths for the triangle below. Identify the figure created by revolving the triangle 360o about the axis. Find the volume of this figure. Show your work.

*Scoring: 3 pts.: 1 pt. for identification of figure, 2 pts. for accurate volume calculation and process*

5. **Extra credit**: Which two-dimensional shape would create a sphere if revolved around an axis? How would it need to be positioned relative to that axis? Illustrate below. *(1 pt.)*